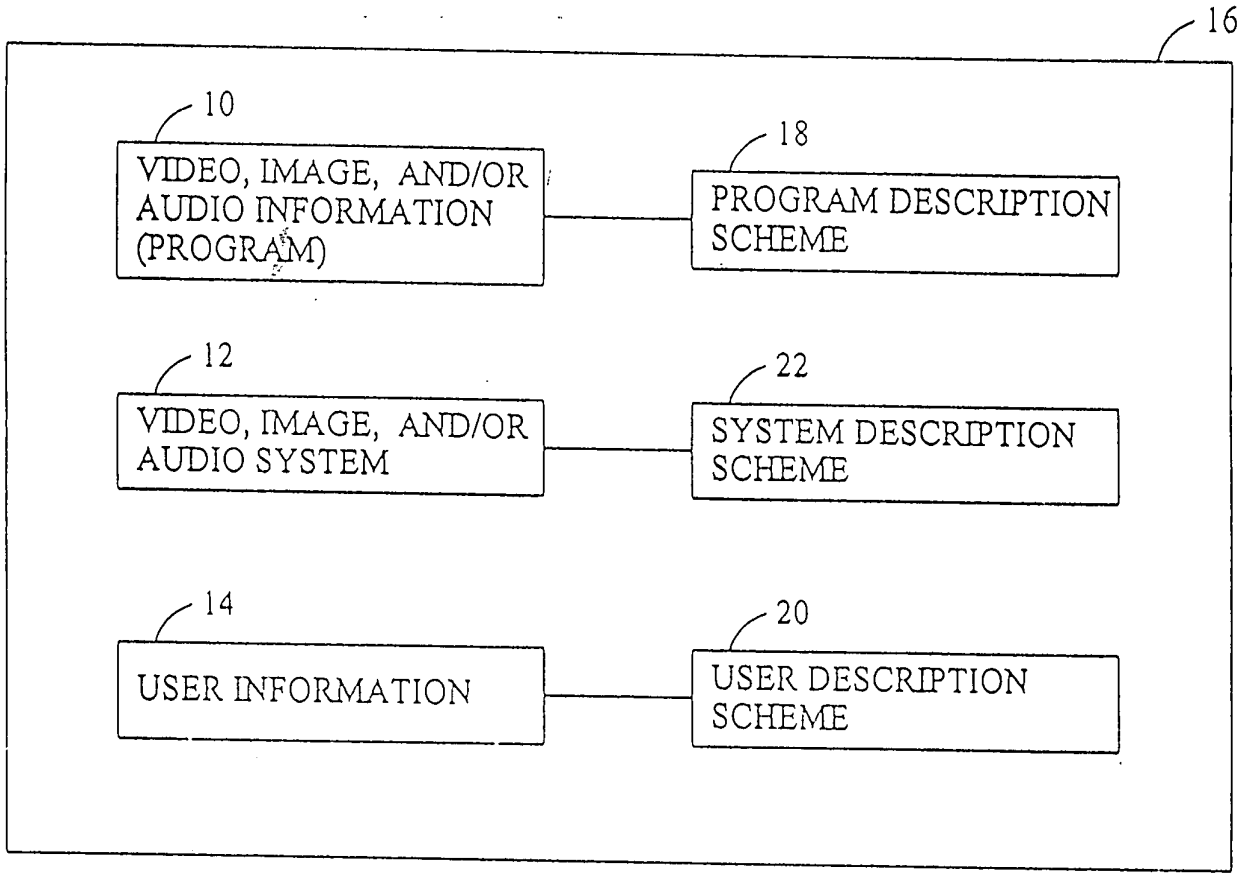
16
10
VIDEO, IMAGE, AND/OR AUDIO INFORMATION (PROGRAM)
18
PROGRAM DESCRIPTION SCHEME
12
VIDEO, IMAGE, AND/OR AUDIO SYSTEM
22
SYSTEM DESCRIPTION SCHEME
14
USER INFORMATION
20
USER DESCRIPTION SCHEME

FIG. 1

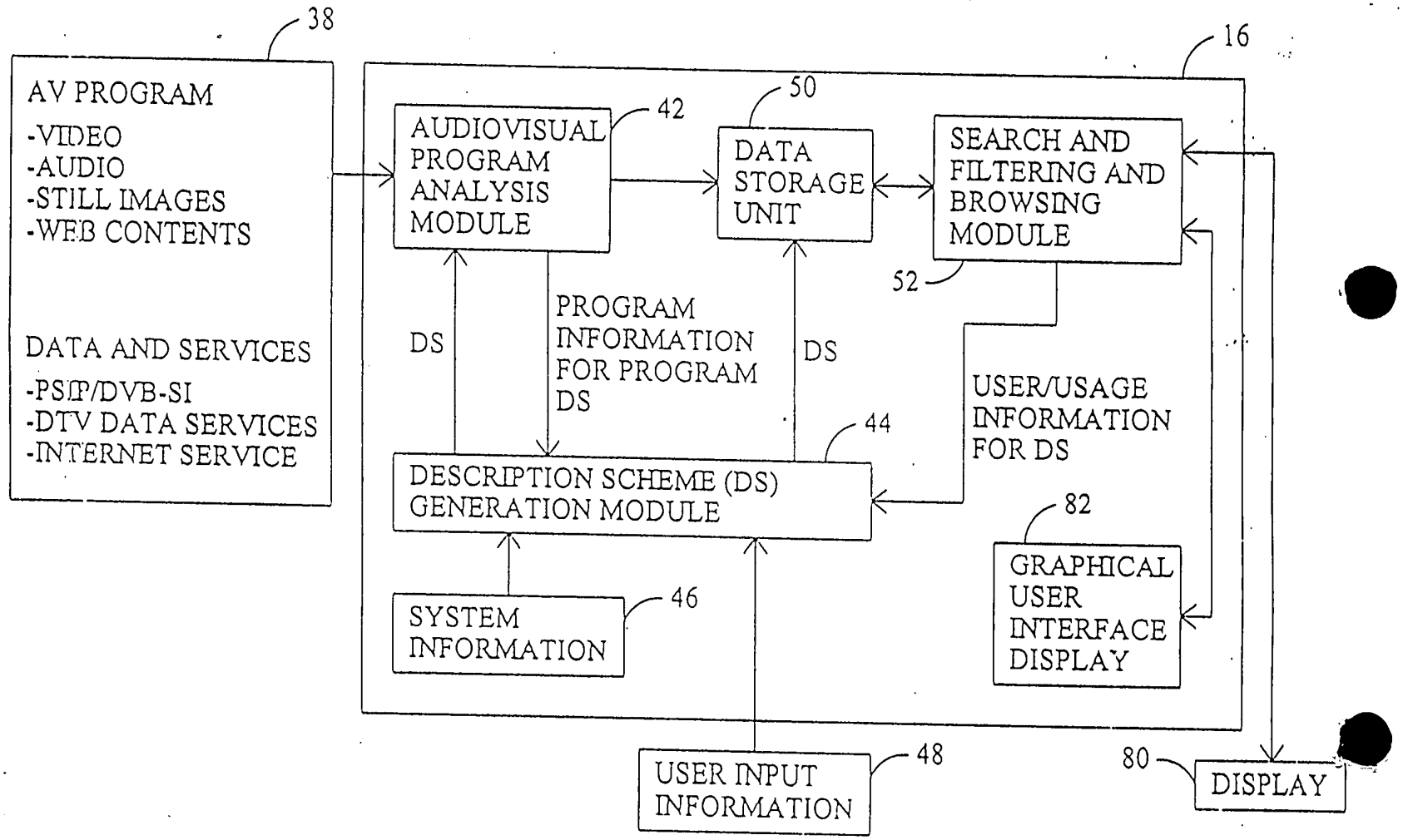
38
AV PROGRAM
-VIDEO
-AUDIO
-STILL IMAGES
-WEB CONTENTS
DATA AND SERVICES
-PSIP/DVB-SI
-DTV DATA SERVICES
-INTERNET SERVICE
16
AUDIOVISUAL PROGRAM ANALYSIS MODULE
42
DATA STORAGE UNIT
50
SEARCH AND FILTERING AND BROWSING MODULE
52
DS
PROGRAM INFORMATION FOR PROGRAM DS
DS
USER/USAGE INFORMATION FOR DS
DESCRIPTION SCHEME (DS) GENERATION MODULE
44
82
GRAPHICAL USER INTERFACE DISPLAY
SYSTEM INFORMATION
46
USER INPUT INFORMATION
48
80
DISPLAY

FIG. 2

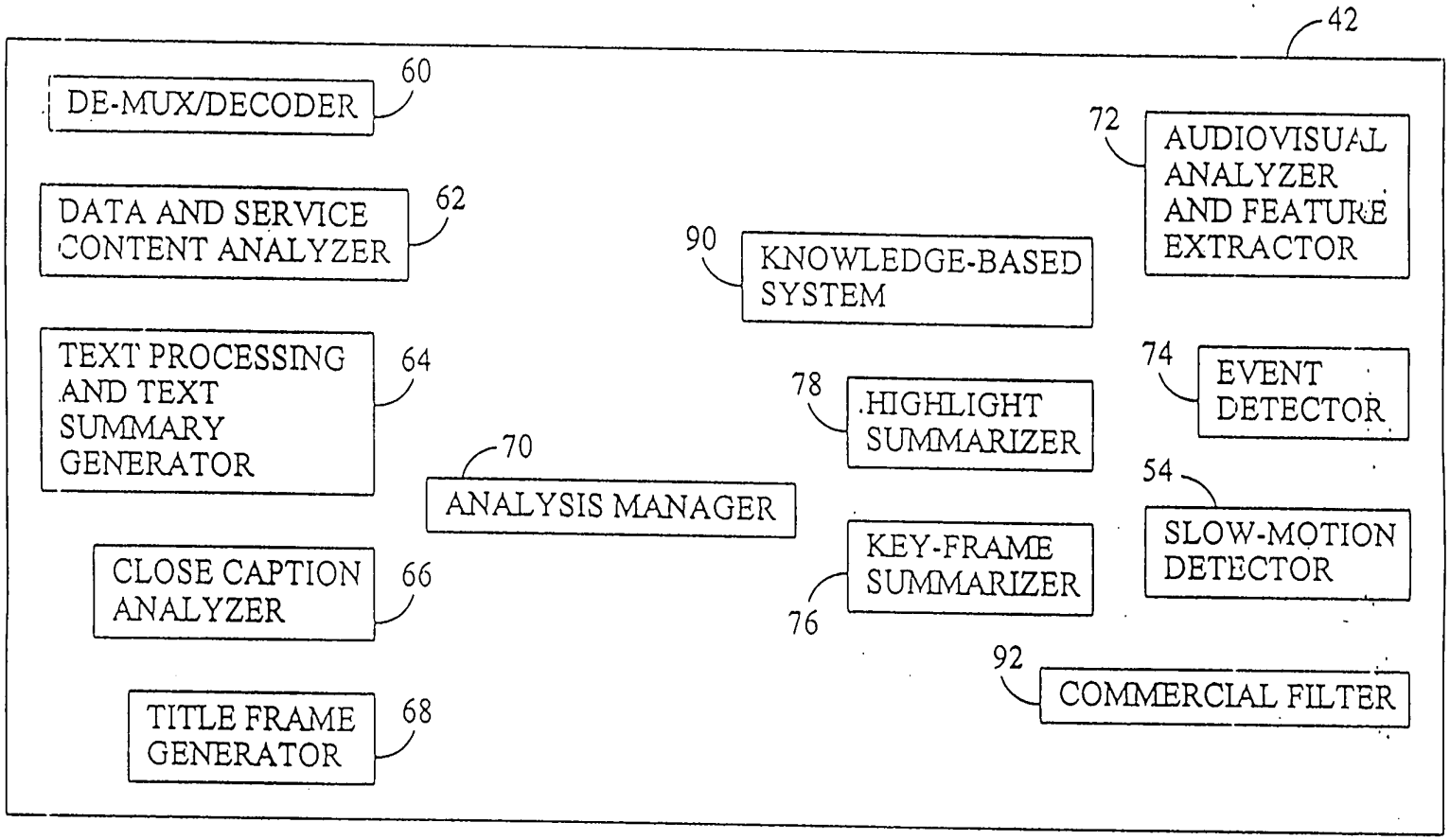
42
DE-MUX/DECODER
60
DATA AND SERVICE CONTENT ANALYZER
62
TEXT PROCESSING AND TEXT SUMMARY GENERATOR
64
CLOSE CAPTION ANALYZER
66
TITLE FRAME GENERATOR
68
ANALYSIS MANAGER
70
KNOWLEDGE-BASED SYSTEM
90
HIGHLIGHT SUMMARIZER
78
KEY-FRAME SUMMARIZER
76
AUDIOVISUAL ANALYZER AND FEATURE EXTRACTOR
72
EVENT DETECTOR
74
SLOW-MOTION DETECTOR
54
COMMERCIAL FILTER
92

FIG. 3

Thumbnail View (Category)

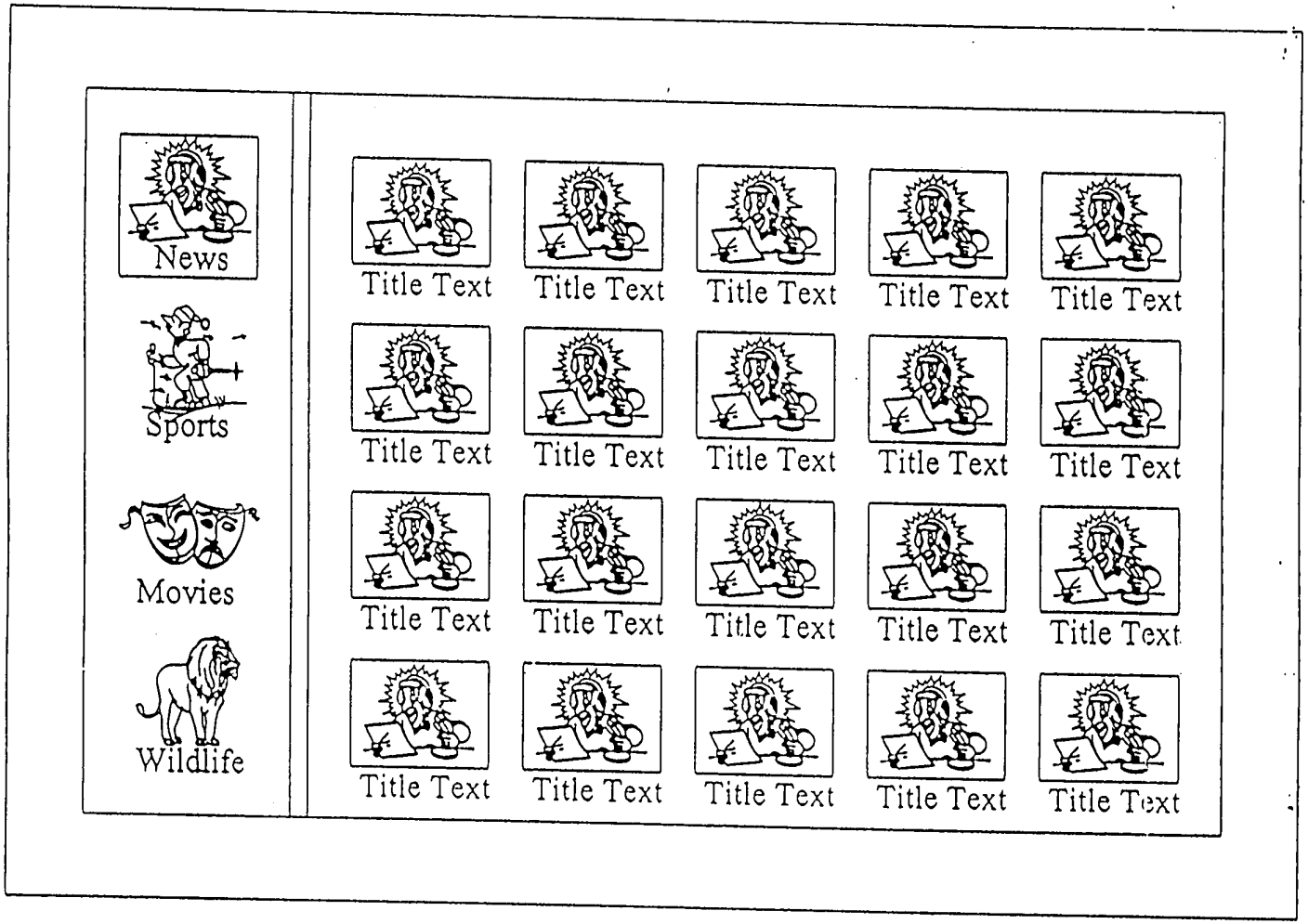

FIG. 4

Thumbnail View (Channel)

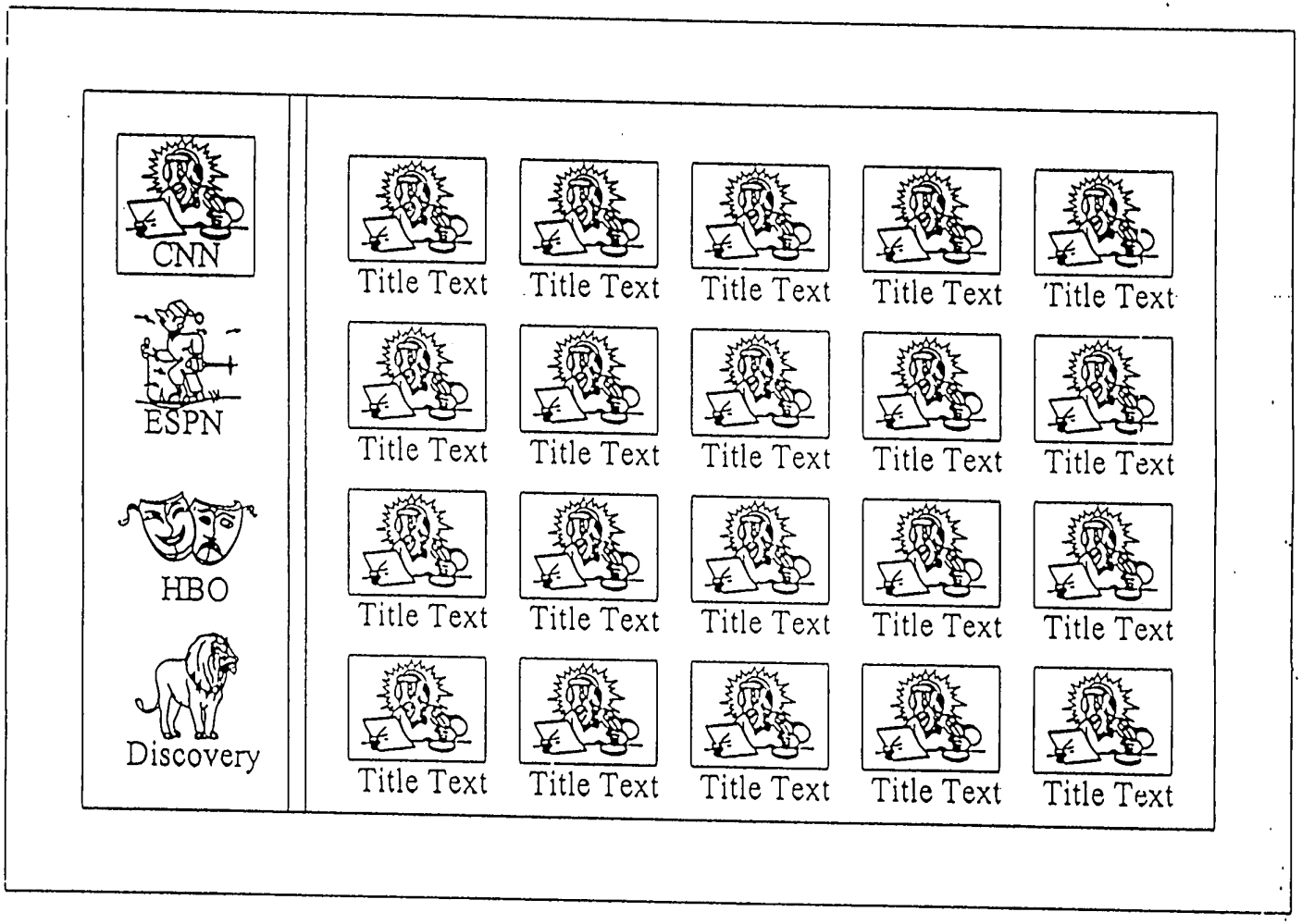

FIG. 5

Text View (Channel)

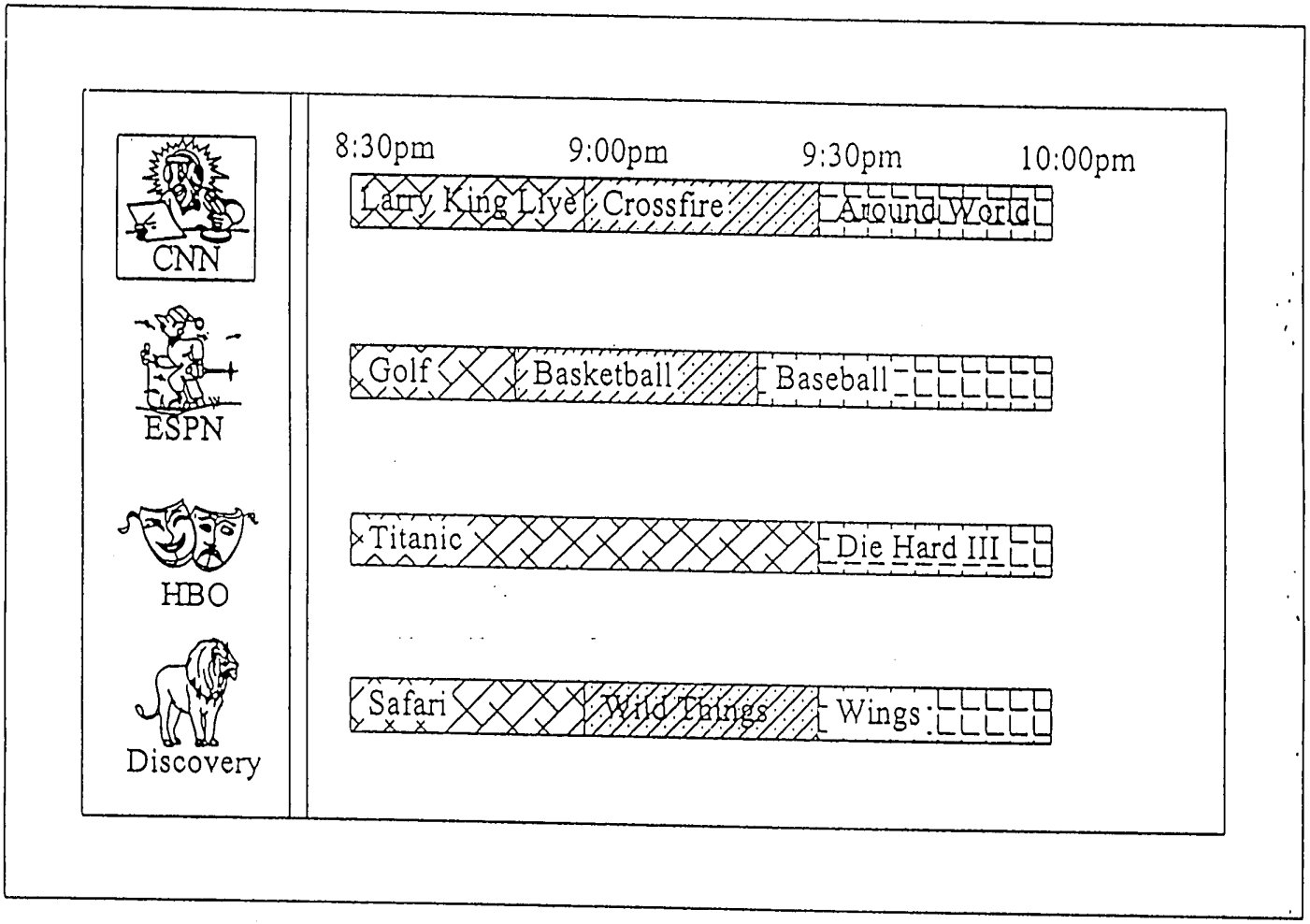

FIG. 6

Frame View

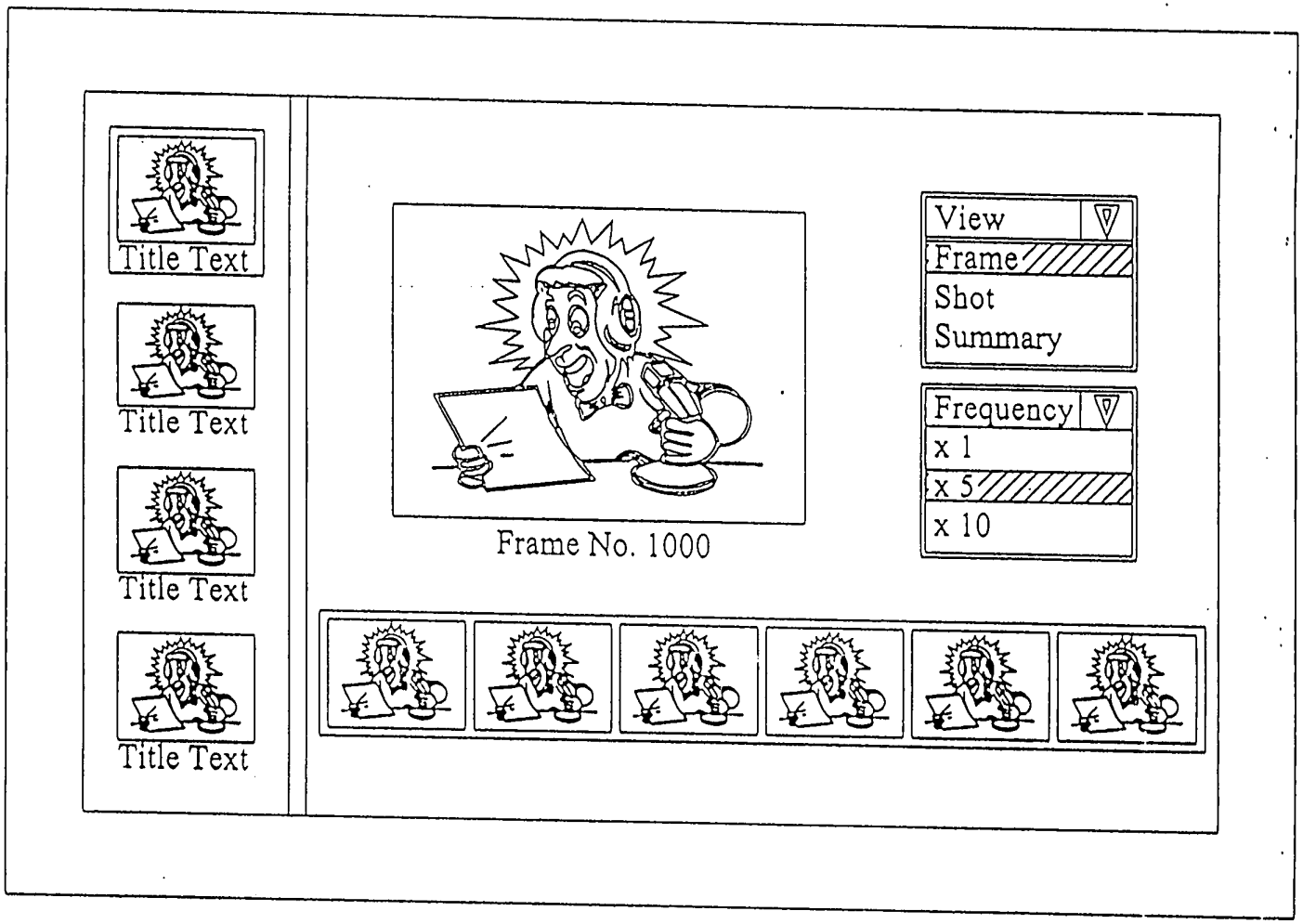

FIG. 7

Shot View

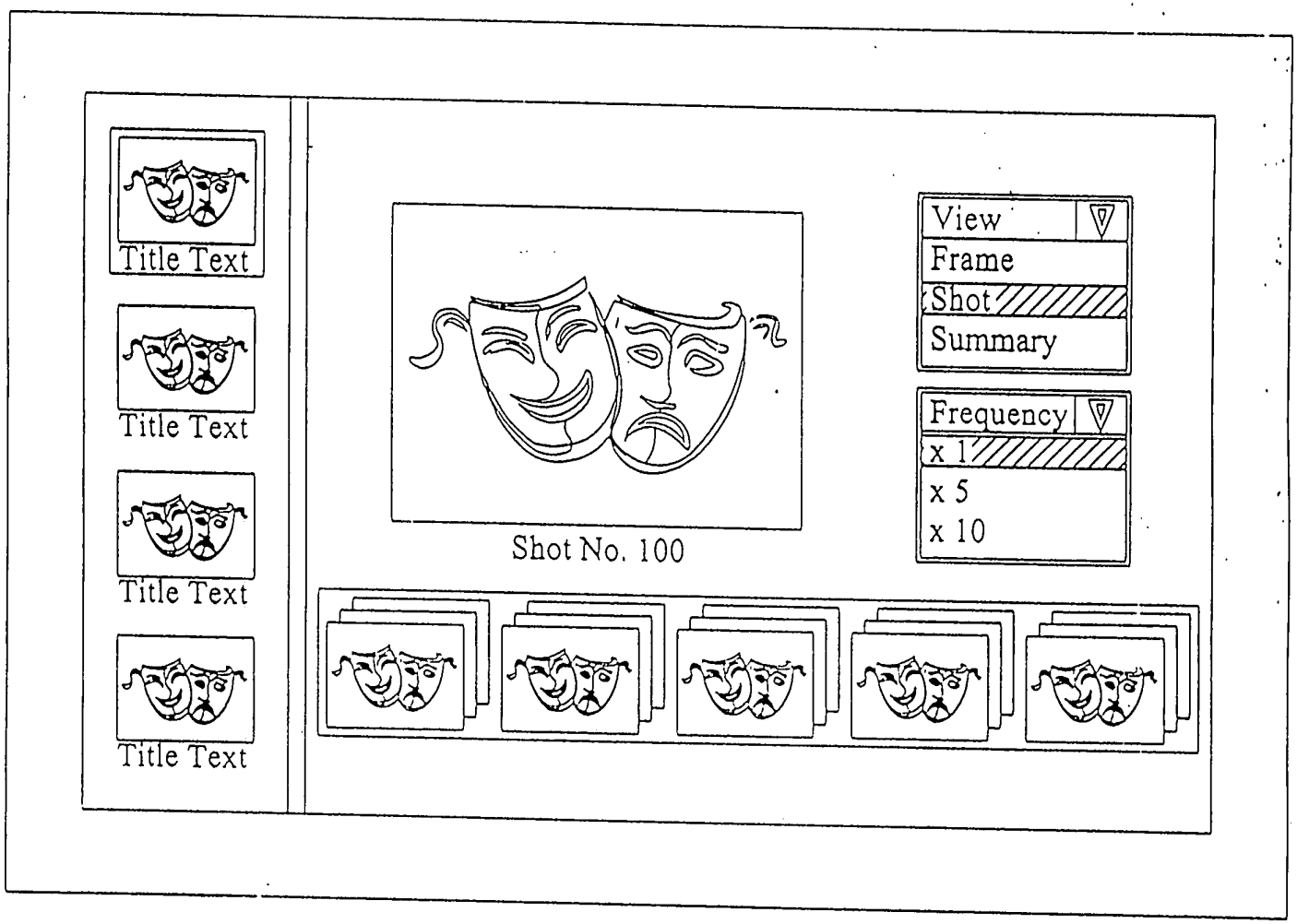

FIG. 8

Key Frame View

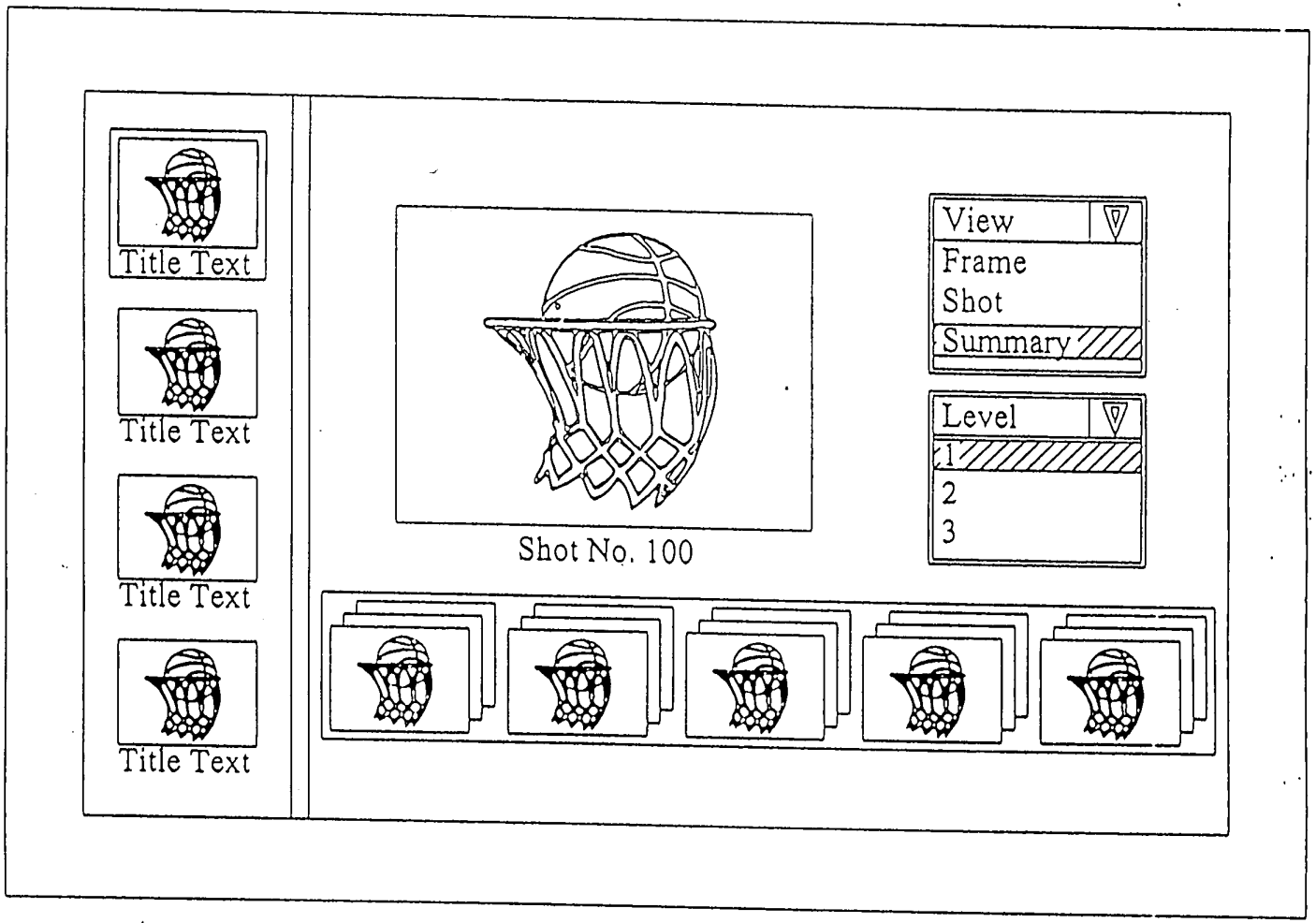

FIG. 9

Highlight View

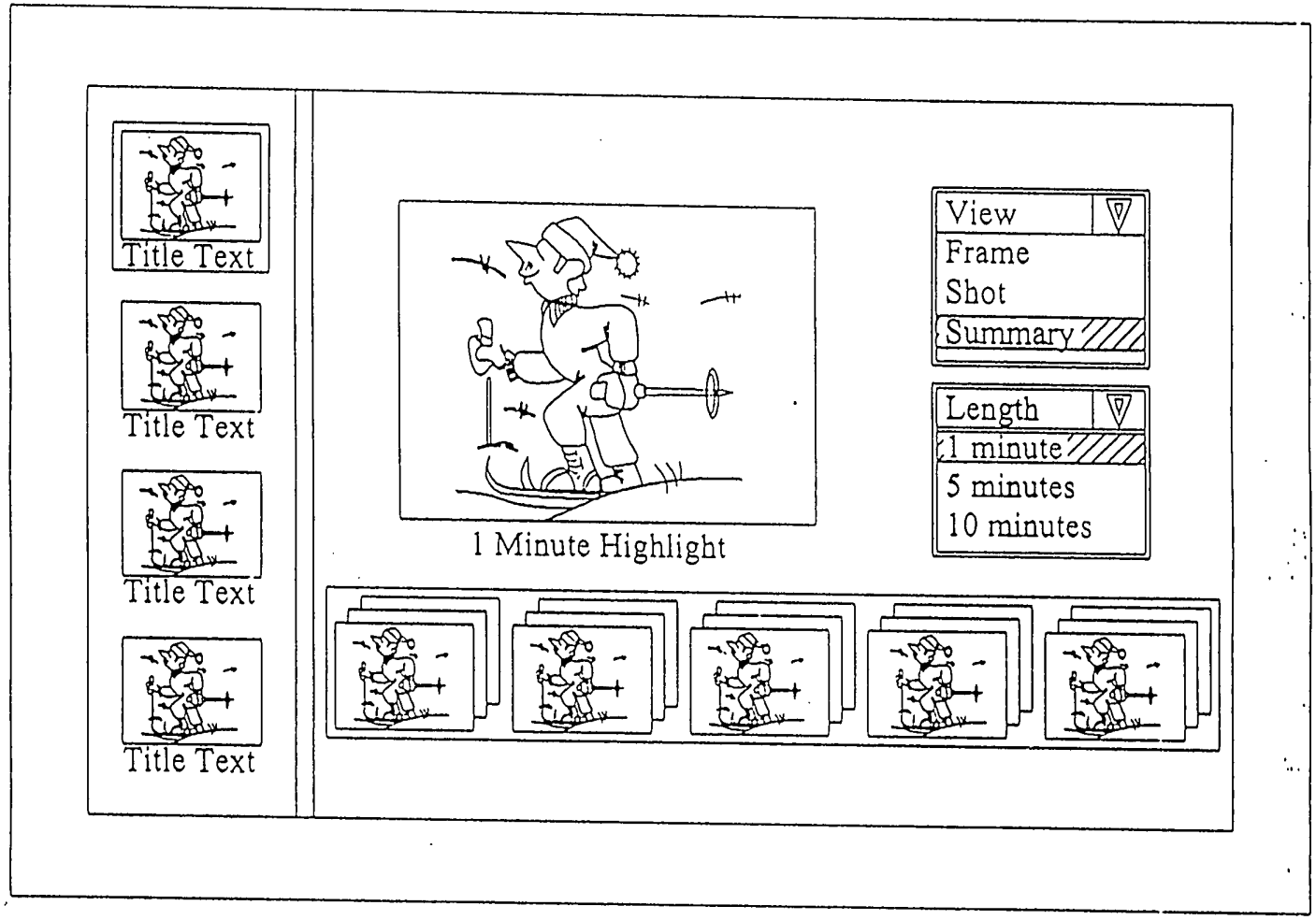

FIG. 10

Event View

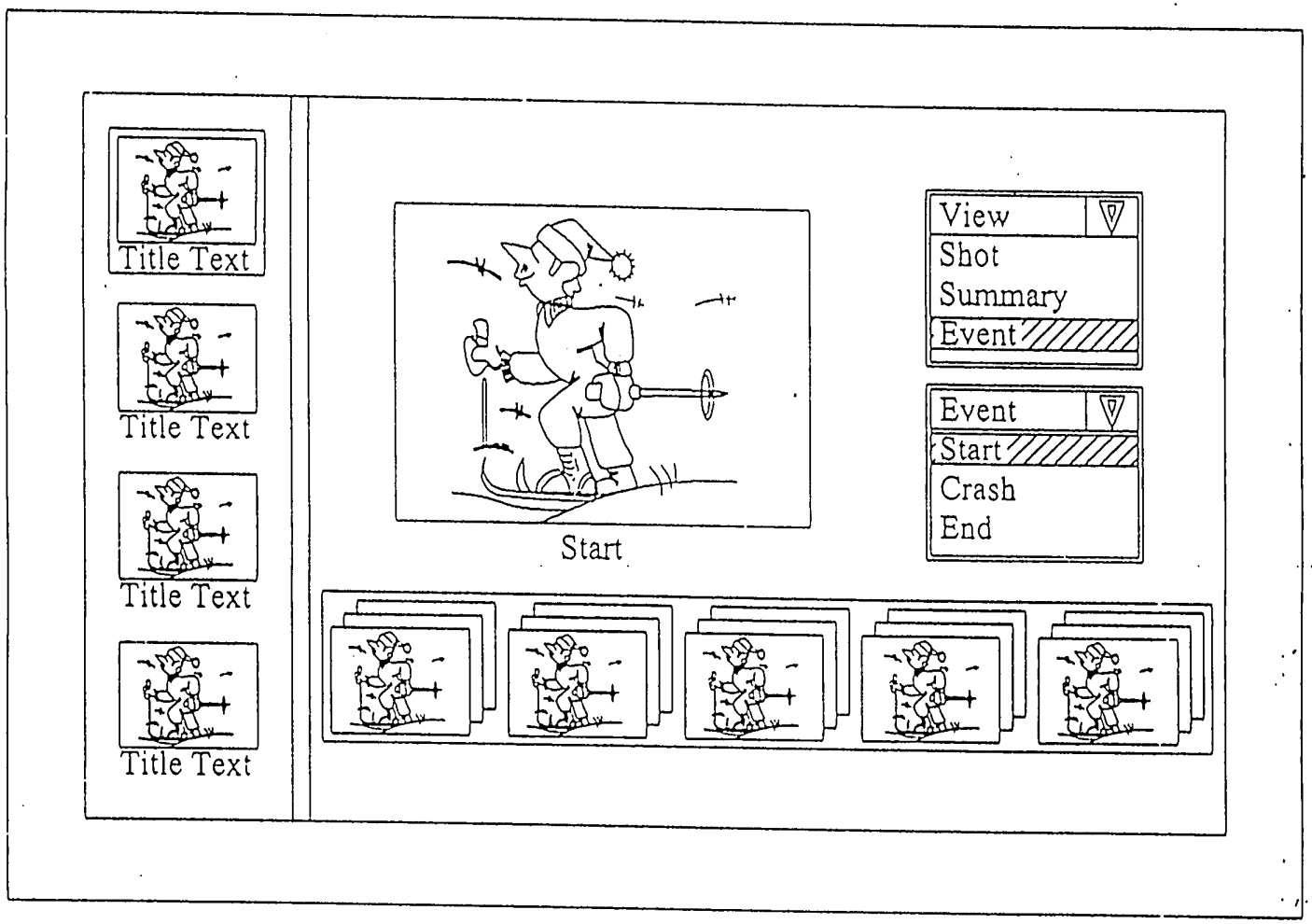

FIG. 11

Character/Object View

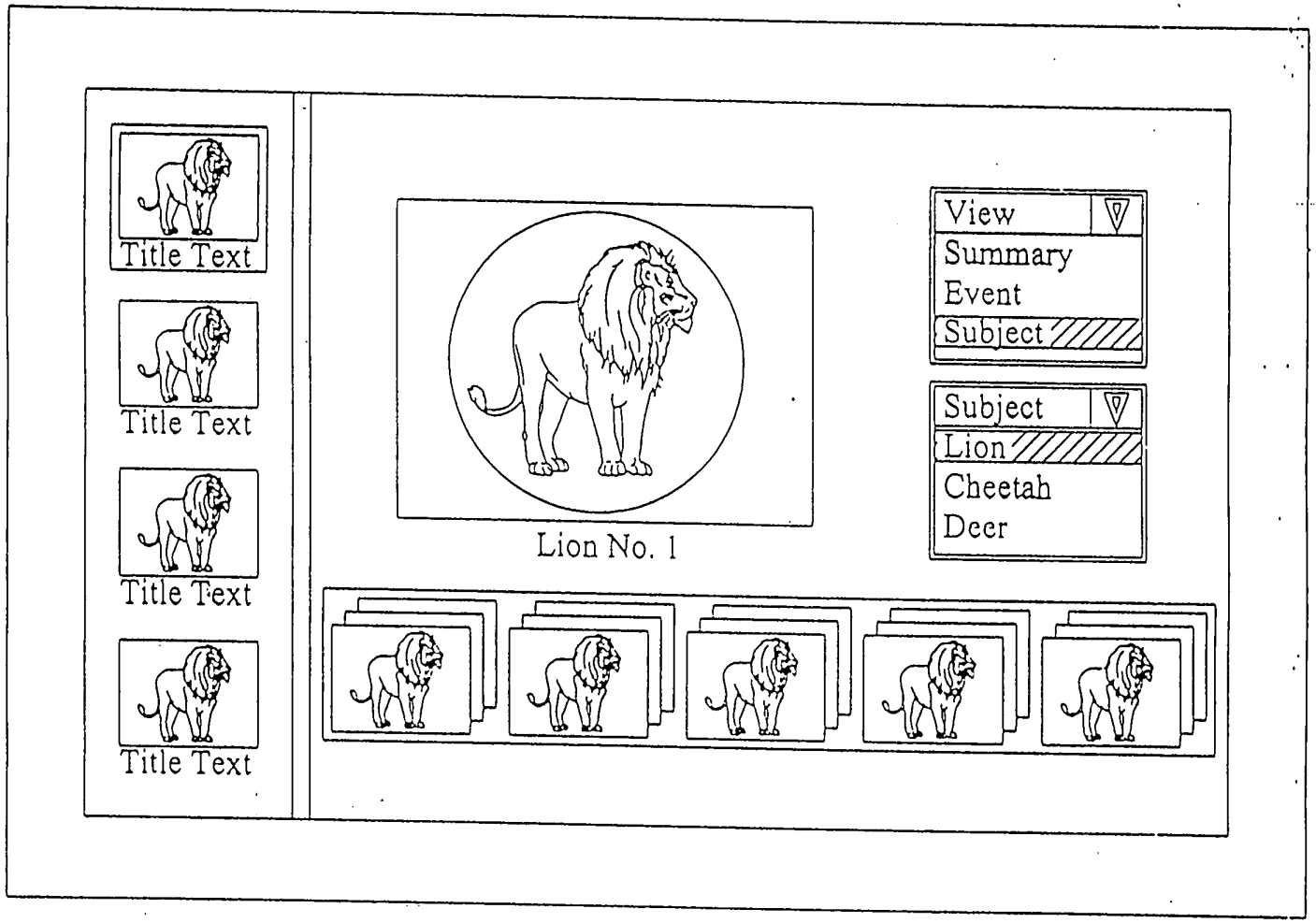

FIG. 12

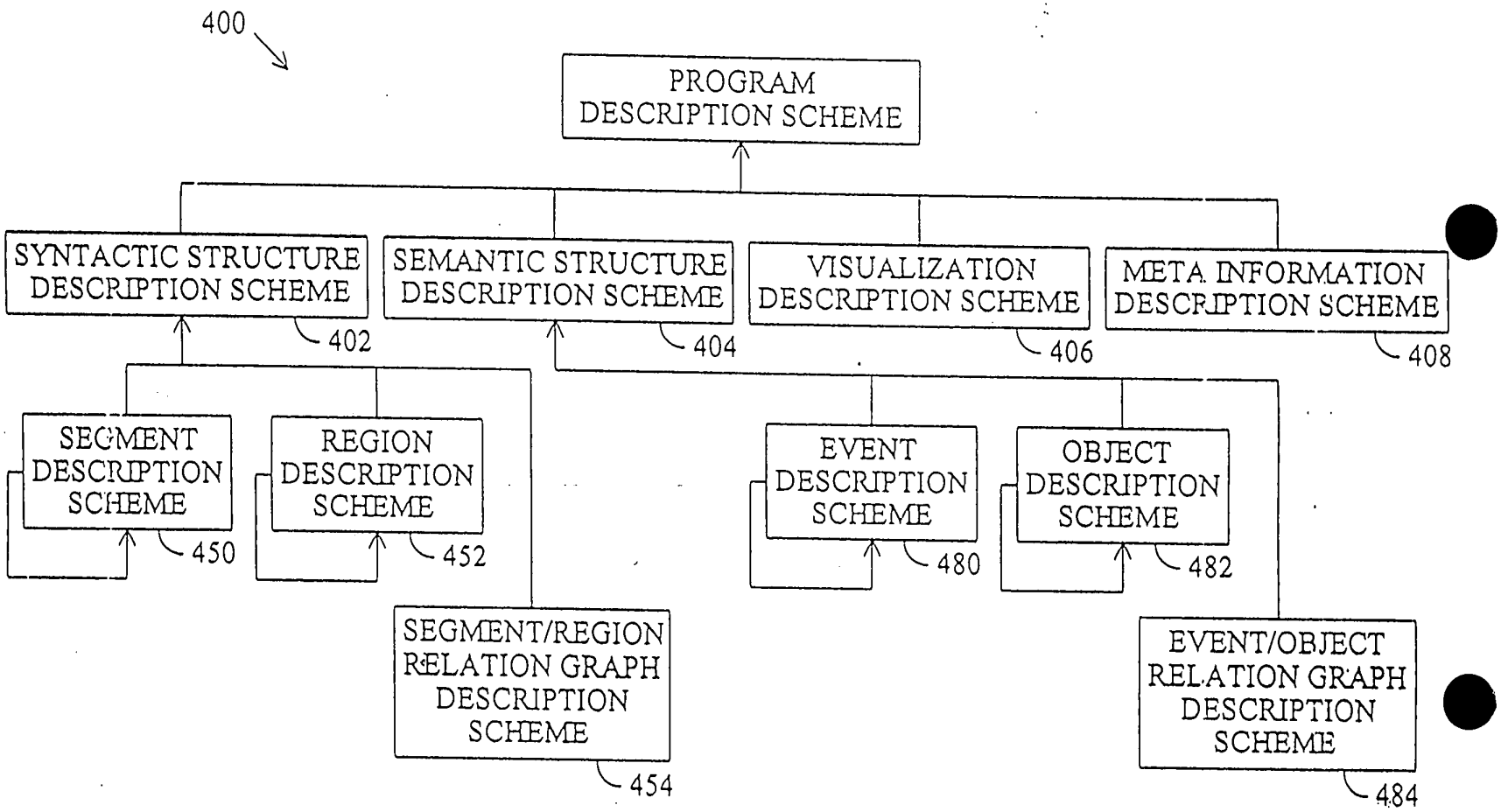
400
PROGRAM DESCRIPTION SCHEME
SYNTACTIC STRUCTURE DESCRIPTION SCHEME
402
SEMANTIC STRUCTURE DESCRIPTION SCHEME
404
VISUALIZATION DESCRIPTION SCHEME
406
META INFORMATION DESCRIPTION SCHEME
408
SEGMENT DESCRIPTION SCHEME
450
REGION DESCRIPTION SCHEME
452
SEGMENT/REGION RELATION GRAPH DESCRIPTION SCHEME
454
EVENT DESCRIPTION SCHEME
480
OBJECT DESCRIPTION SCHEME
482
EVENT/OBJECT RELATION GRAPH DESCRIPTION SCHEME
484

FIG. 13

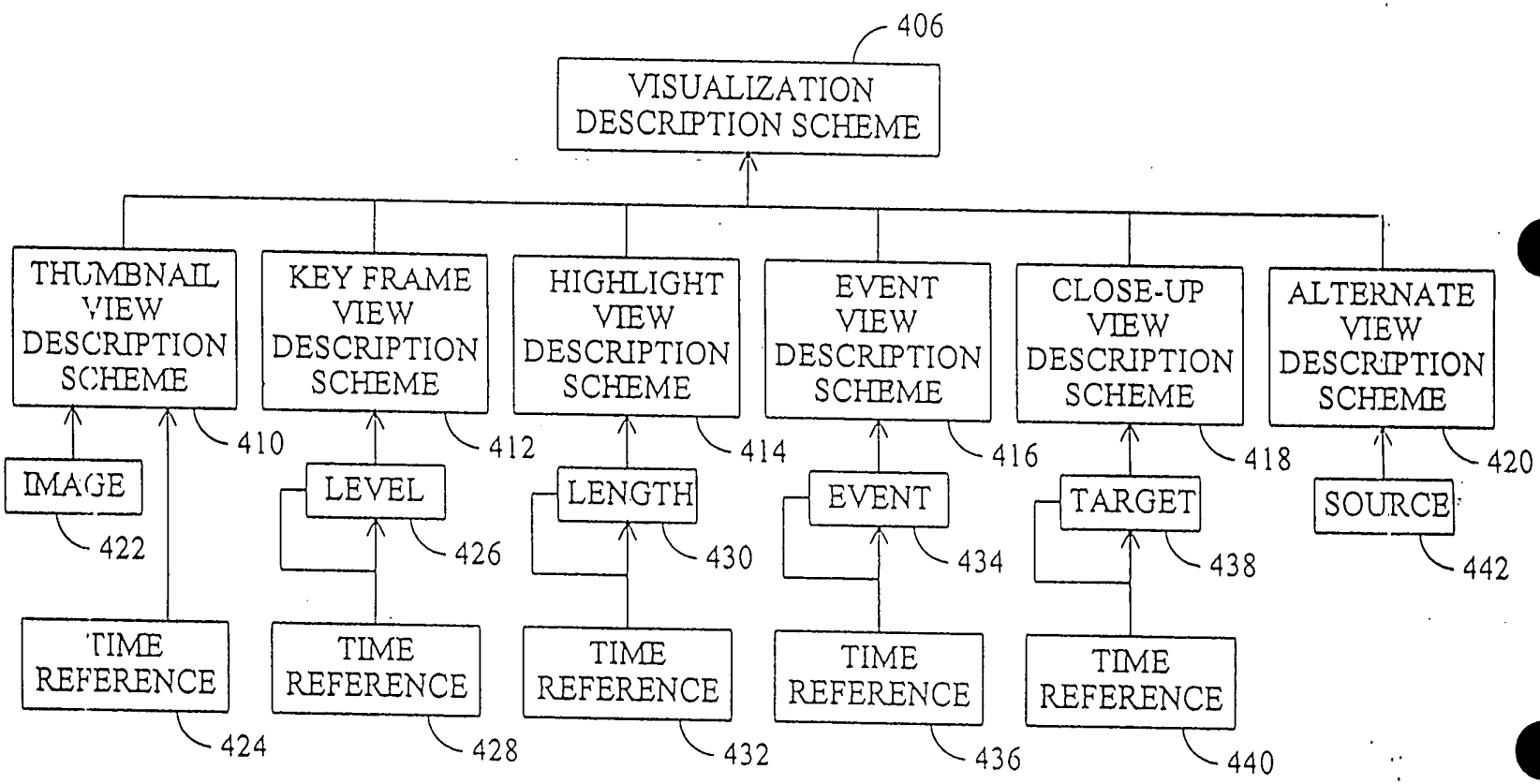
406
VISUALIZATION DESCRIPTION SCHEME
THUMBNAIL VIEW DESCRIPTION SCHEME
KEY FRAME VIEW DESCRIPTION SCHEME
HIGHLIGHT VIEW DESCRIPTION SCHEME
EVENT VIEW DESCRIPTION SCHEME
CLOSE-UP VIEW DESCRIPTION SCHEME
ALTERNATE VIEW DESCRIPTION SCHEME
410
412
414
416
418
420
IMAGE
LEVEL
LENGTH
EVENT
TARGET
SOURCE
422
426
430
434
438
442
TIME REFERENCE
TIME REFERENCE
TIME REFERENCE
TIME REFERENCE
TIME REFERENCE
424
428
432
436
440

FIG. 14

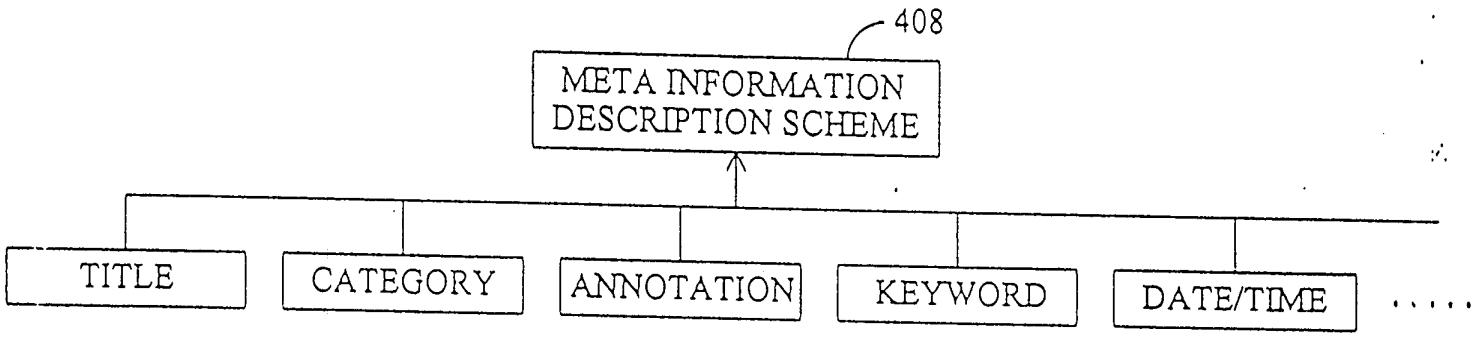
408
META INFORMATION DESCRIPTION SCHEME
TITLE
CATEGORY
ANNOTATION
KEYWORD
DATE/TIME
.....

FIG. 15

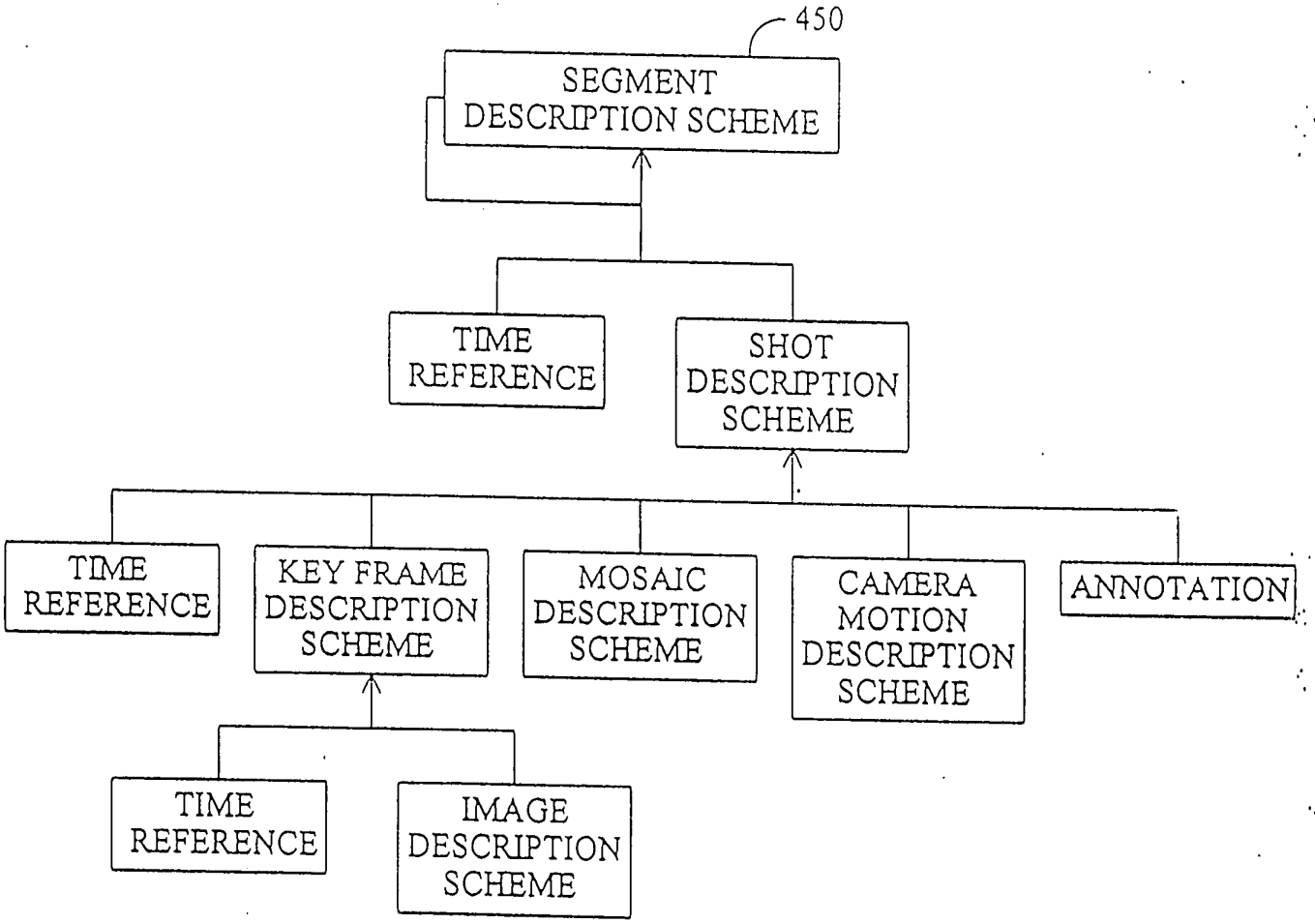
450
SEGMENT DESCRIPTION SCHEME
TIME REFERENCE
SHOT DESCRIPTION SCHEME
TIME REFERENCE
KEY FRAME DESCRIPTION SCHEME
MOSAIC DESCRIPTION SCHEME
CAMERA MOTION DESCRIPTION SCHEME
ANNOTATION
TIME REFERENCE
IMAGE DESCRIPTION SCHEME

FIG. 16

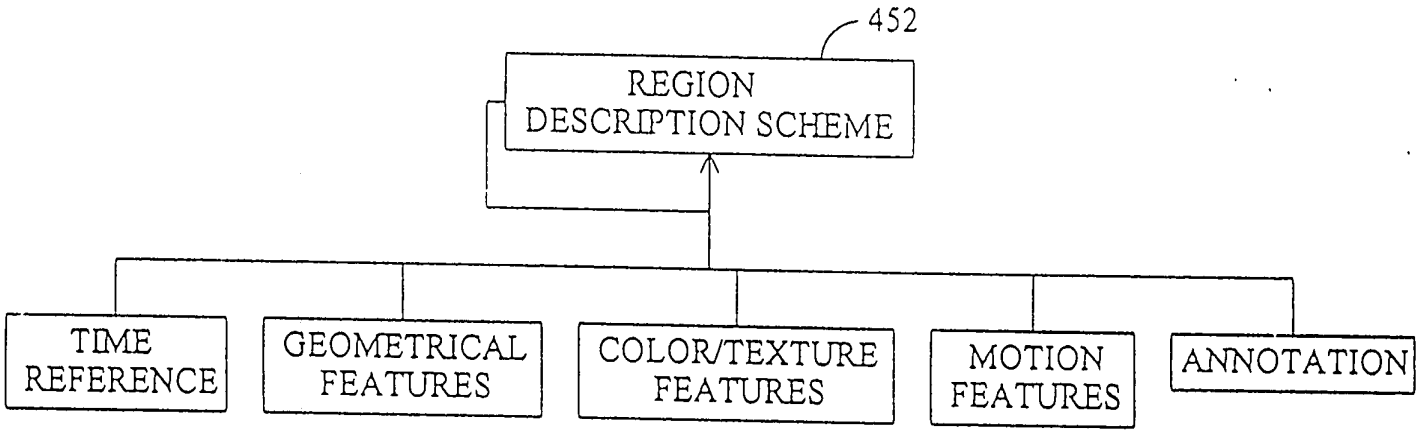
452
REGION DESCRIPTION SCHEME
TIME REFERENCE
GEOMETRICAL FEATURES
COLOR/TEXTURE FEATURES
MOTION FEATURES
ANNOTATION

FIG. 17

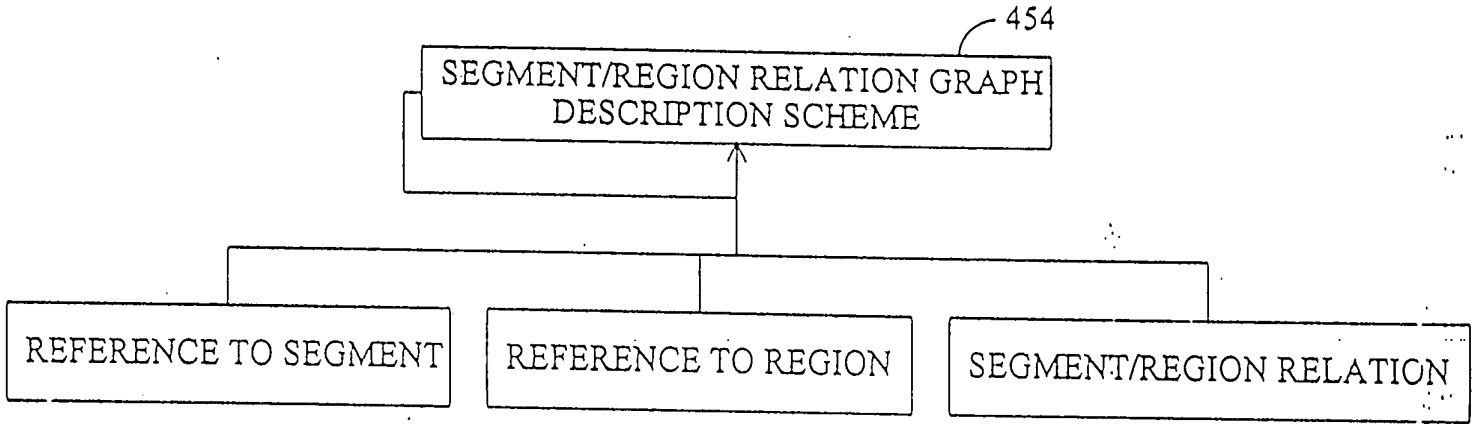
454
SEGMENT/REGION RELATION GRAPH DESCRIPTION SCHEME
REFERENCE TO SEGMENT
REFERENCE TO REGION
SEGMENT/REGION RELATION

FIG. 18

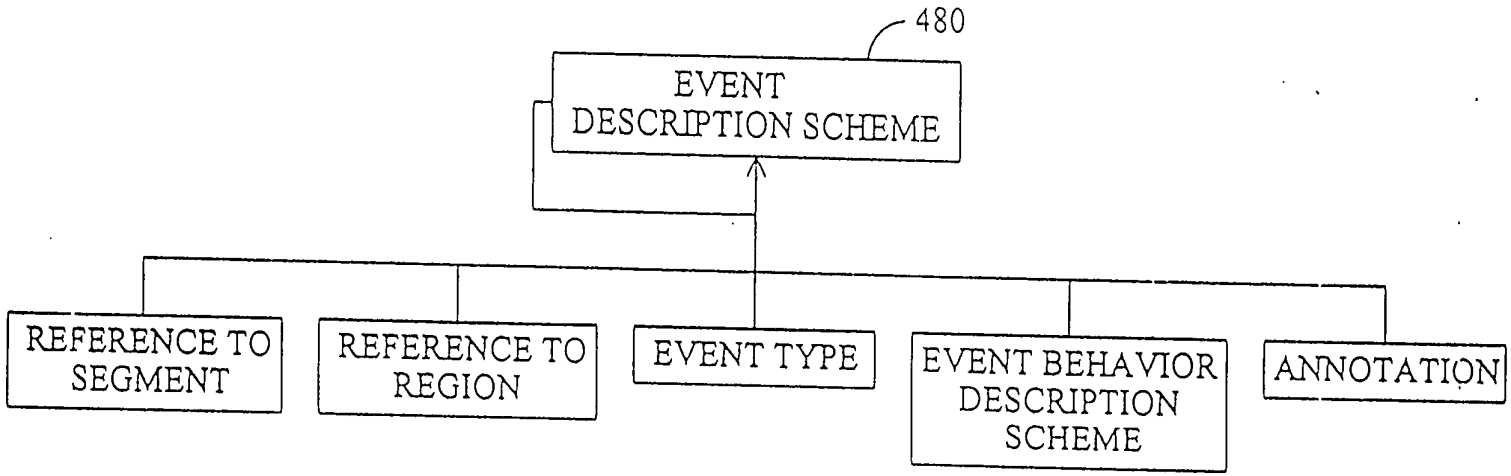
480
EVENT DESCRIPTION SCHEME
REFERENCE TO SEGMENT
REFERENCE TO REGION
EVENT TYPE
EVENT BEHAVIOR DESCRIPTION SCHEME
ANNOTATION

FIG. 19

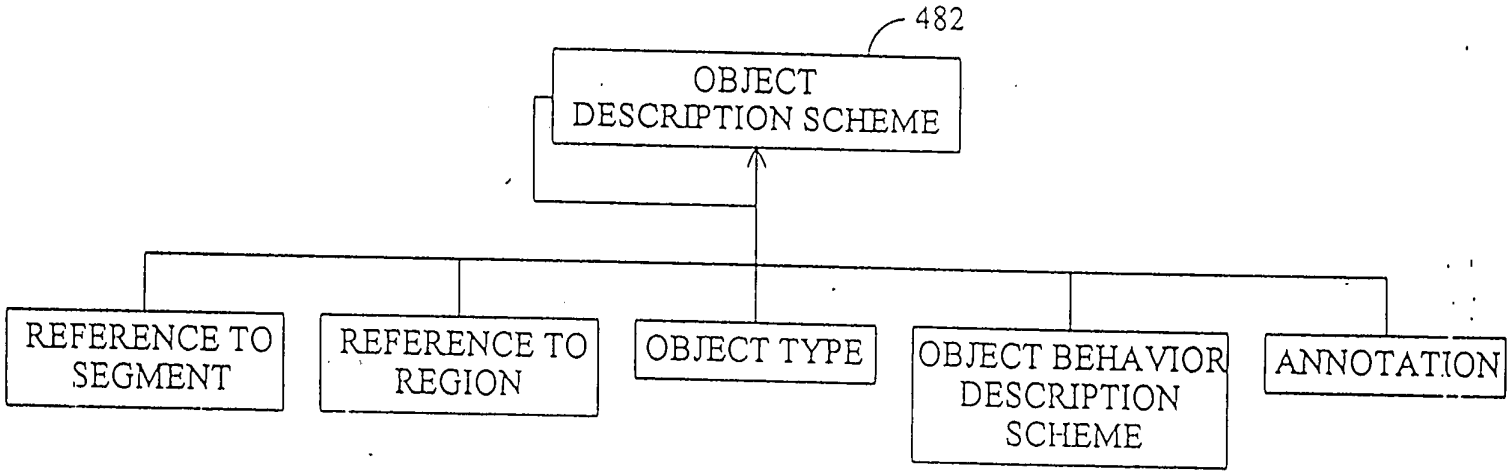
482
OBJECT DESCRIPTION SCHEME
REFERENCE TO SEGMENT
REFERENCE TO REGION
OBJECT TYPE
OBJECT BEHAVIOR DESCRIPTION SCHEME
ANNOTATION

FIG. 20

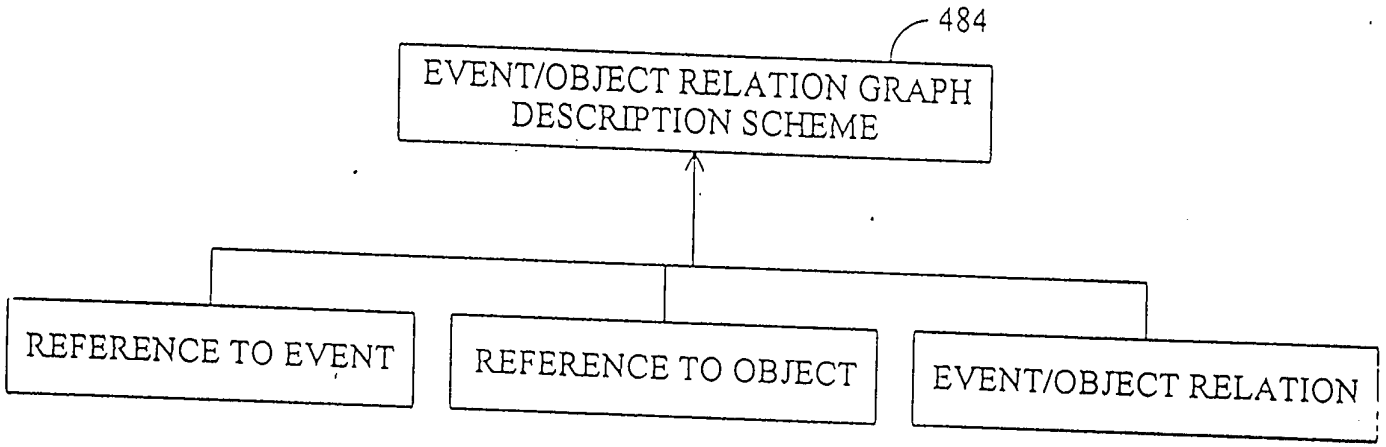
484
EVENT/OBJECT RELATION GRAPH DESCRIPTION SCHEME
REFERENCE TO EVENT
REFERENCE TO OBJECT
EVENT/OBJECT RELATION

FIG. 21

09580808-052500

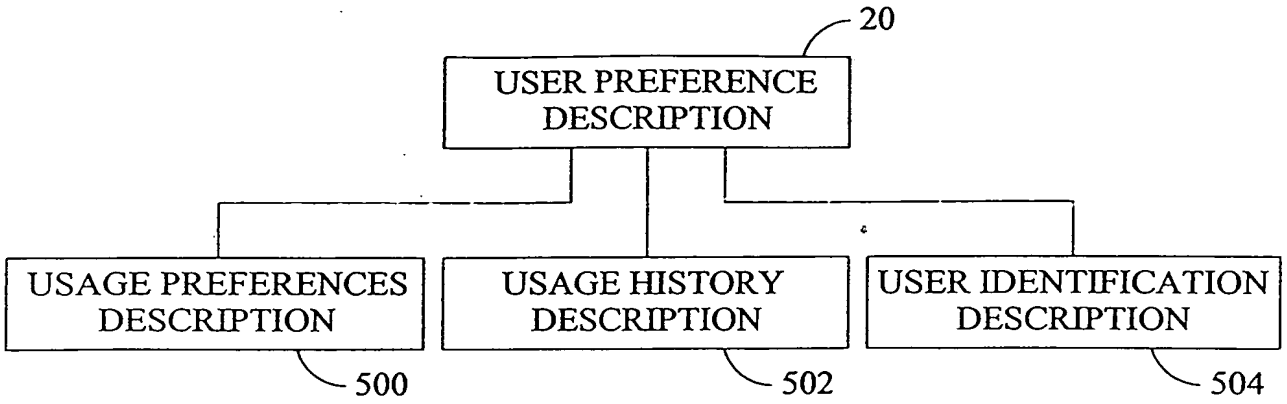

FIG. 22

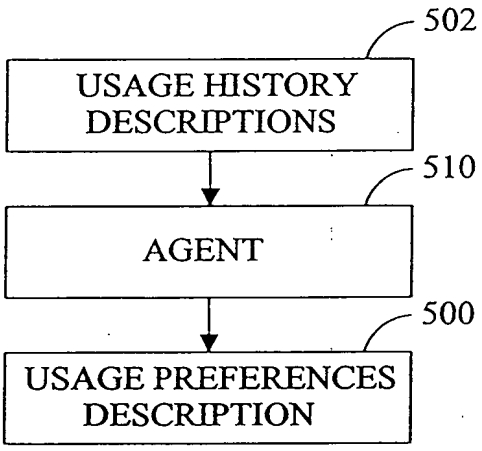

FIG. 23

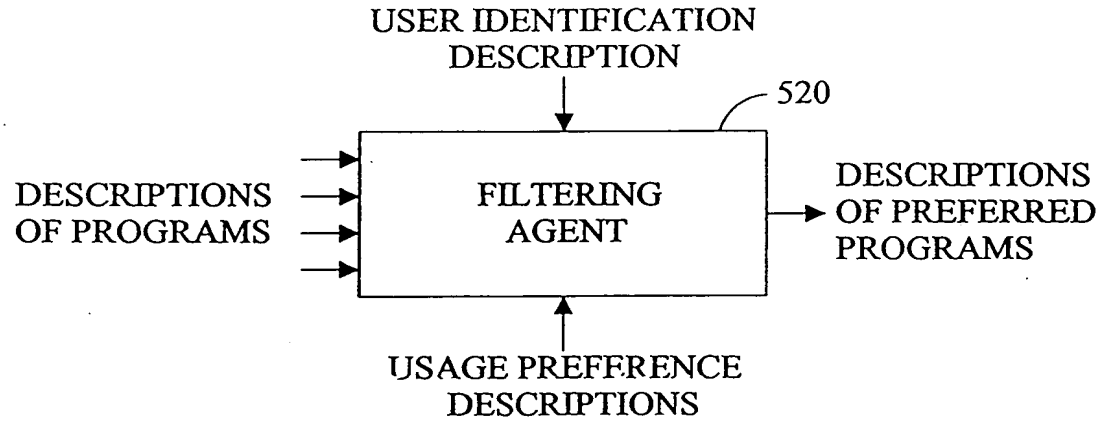

FIG. 24

0958080.052600

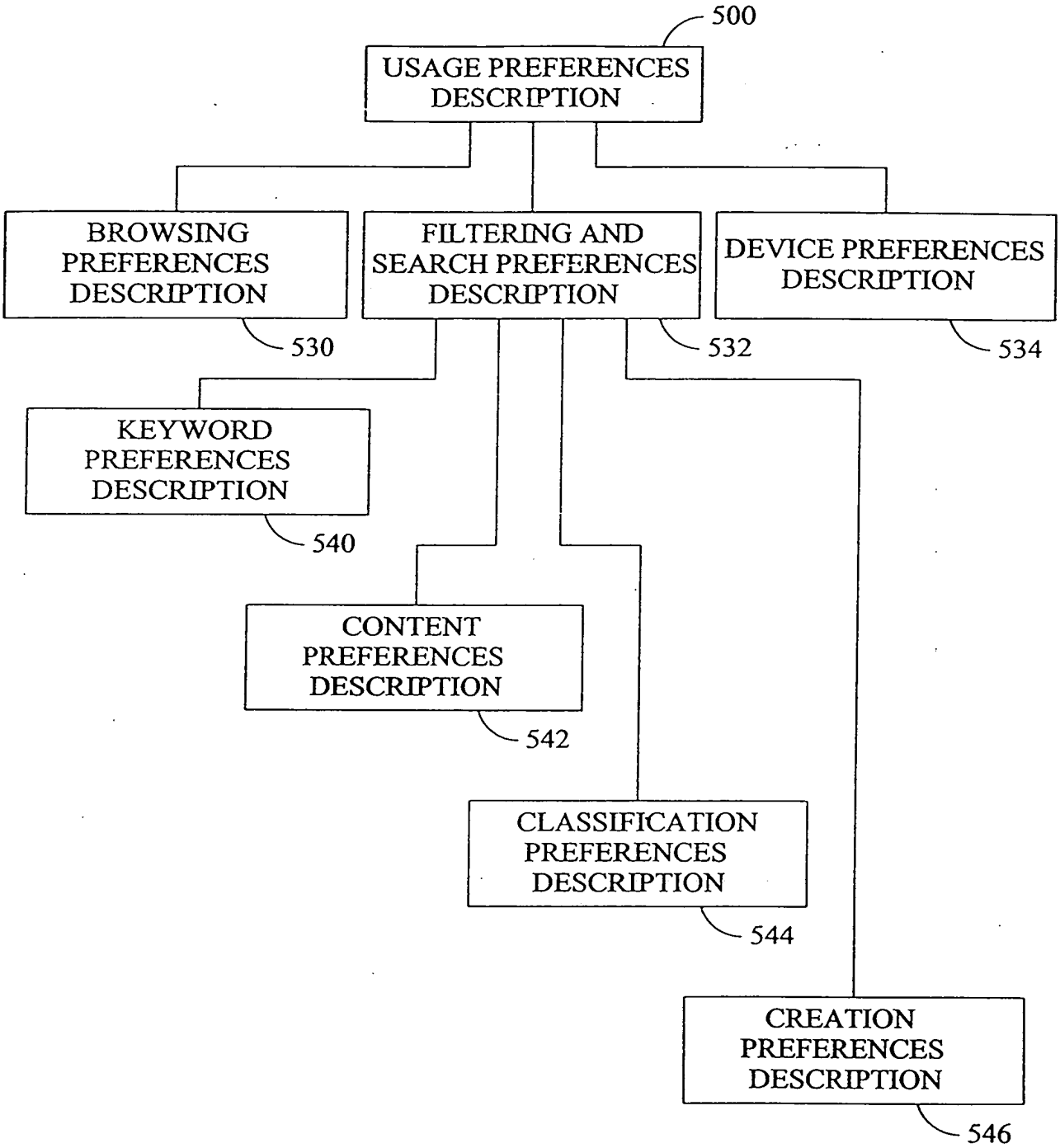

FIG. 25

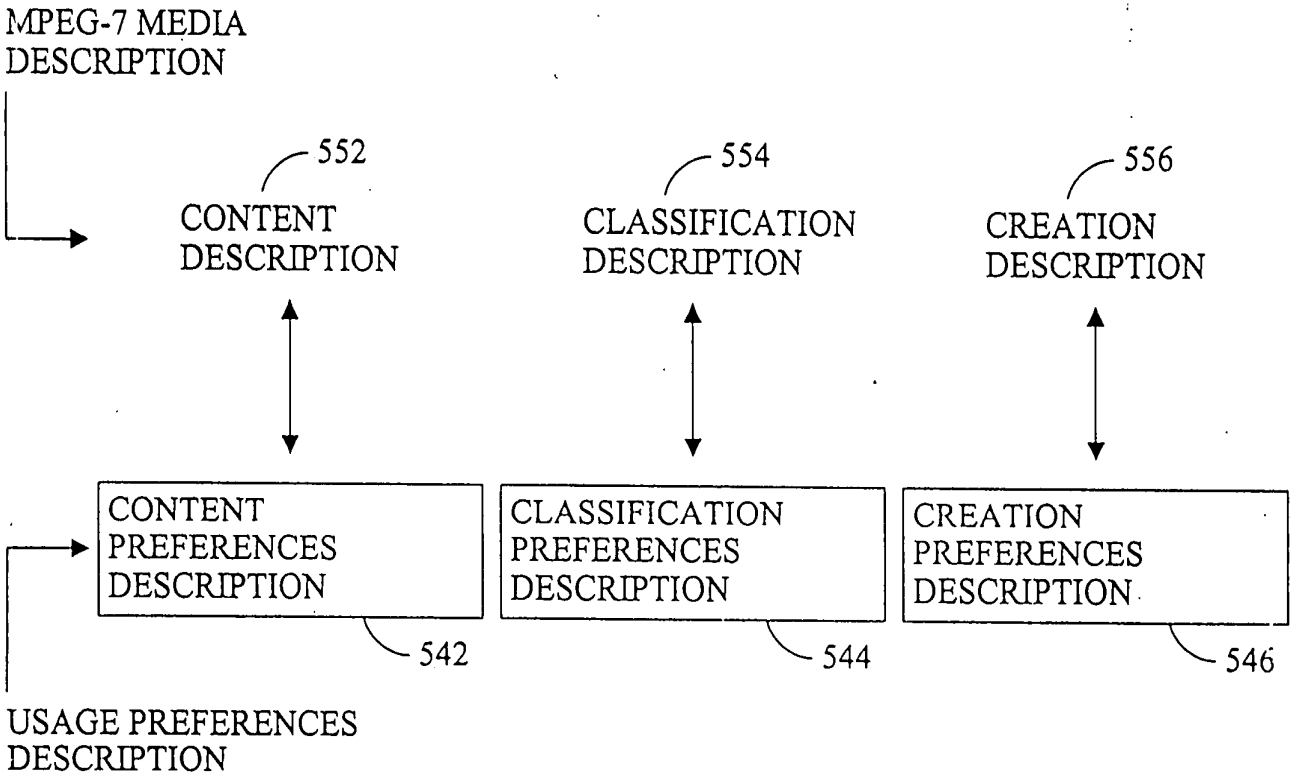
MPEG-7 MEDIA DESCRIPTION
552
CONTENT DESCRIPTION
554
CLASSIFICATION DESCRIPTION
556
CREATION DESCRIPTION
CONTENT PREFERENCES DESCRIPTION
542
CLASSIFICATION PREFERENCES DESCRIPTION
544
CREATION PREFERENCES DESCRIPTION
546
USAGE PREFERENCES DESCRIPTION

FIG. 26

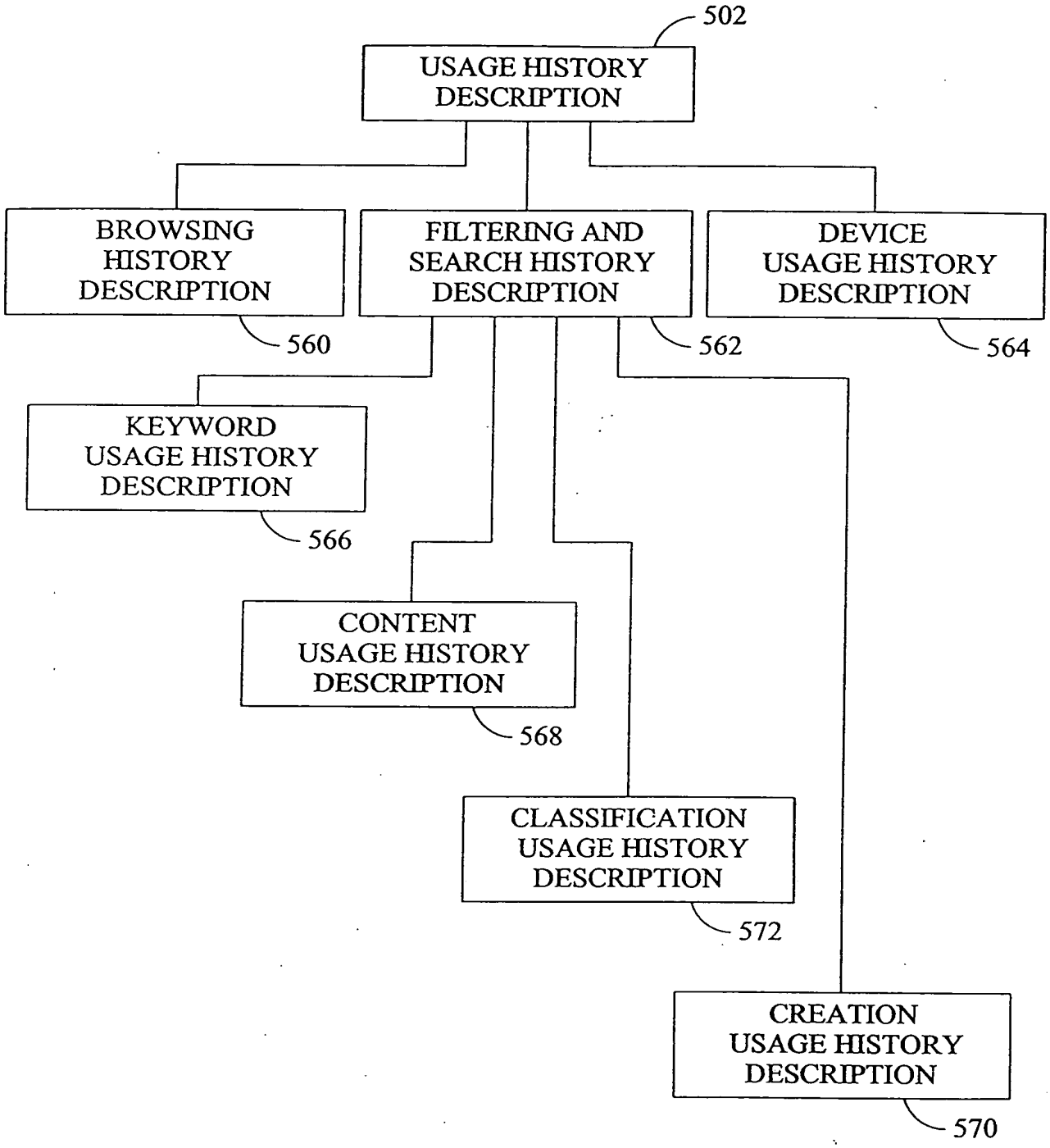
502
USAGE HISTORY DESCRIPTION
BROWSING HISTORY DESCRIPTION
FILTERING AND SEARCH HISTORY DESCRIPTION
DEVICE USAGE HISTORY DESCRIPTION
560
562
564
KEYWORD USAGE HISTORY DESCRIPTION
566
CONTENT USAGE HISTORY DESCRIPTION
568
CLASSIFICATION USAGE HISTORY DESCRIPTION
572
CREATION USAGE HISTORY DESCRIPTION
570

FIG. 27

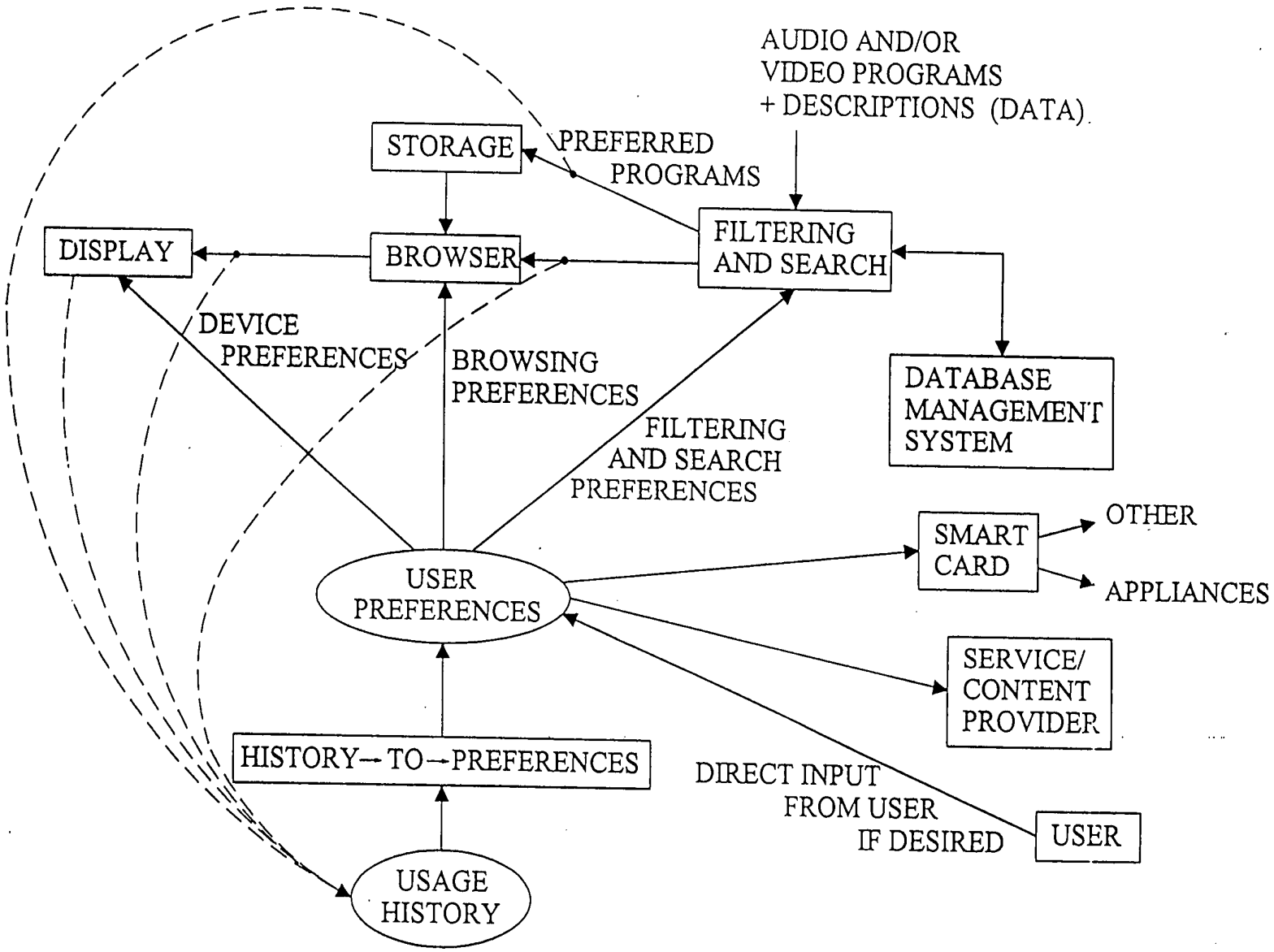
AUDIO AND/OR
VIDEO PROGRAMS
+ DESCRIPTIONS (DATA)
STORAGE
PREFERRED
PROGRAMS
DISPLAY
BROWSER
FILTERING
AND SEARCH
DEVICE
PREFERENCES
BROWSING
PREFERENCES
FILTERING
AND SEARCH
PREFERENCES
DATABASE
MANAGEMENT
SYSTEM
SMART
CARD
OTHER
APPLIANCES
USER
PREFERENCES
SERVICE/
CONTENT
PROVIDER
HISTORY→TO→PREFERENCES
DIRECT INPUT
FROM USER
IF DESIRED
USER
USAGE
HISTORY

FIG. 28

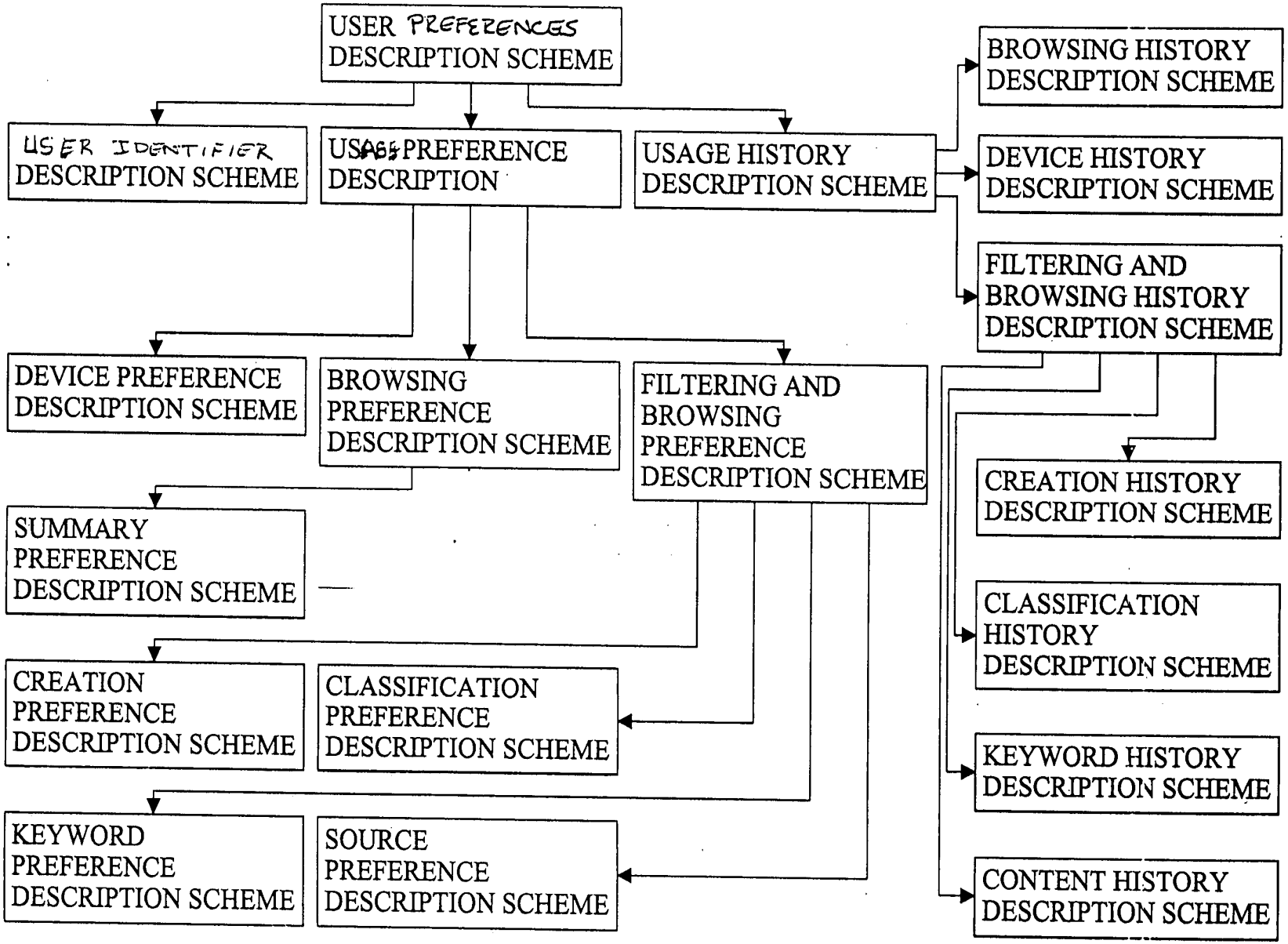
USER PREFERENCES DESCRIPTION SCHEME
USER IDENTIFIER DESCRIPTION SCHEME
USAGE PREFERENCE DESCRIPTION
USAGE HISTORY DESCRIPTION SCHEME
BROWSING HISTORY DESCRIPTION SCHEME
DEVICE HISTORY DESCRIPTION SCHEME
FILTERING AND BROWSING HISTORY DESCRIPTION SCHEME
DEVICE PREFERENCE DESCRIPTION SCHEME
BROWSING PREFERENCE DESCRIPTION SCHEME
FILTERING AND BROWSING PREFERENCE DESCRIPTION SCHEME
CREATION HISTORY DESCRIPTION SCHEME
SUMMARY PREFERENCE DESCRIPTION SCHEME
CLASSIFICATION HISTORY DESCRIPTION SCHEME
CREATION PREFERENCE DESCRIPTION SCHEME
CLASSIFICATION PREFERENCE DESCRIPTION SCHEME
KEYWORD HISTORY DESCRIPTION SCHEME
KEYWORD PREFERENCE DESCRIPTION SCHEME
SOURCE PREFERENCE DESCRIPTION SCHEME
CONTENT HISTORY DESCRIPTION SCHEME

FIG. 29.

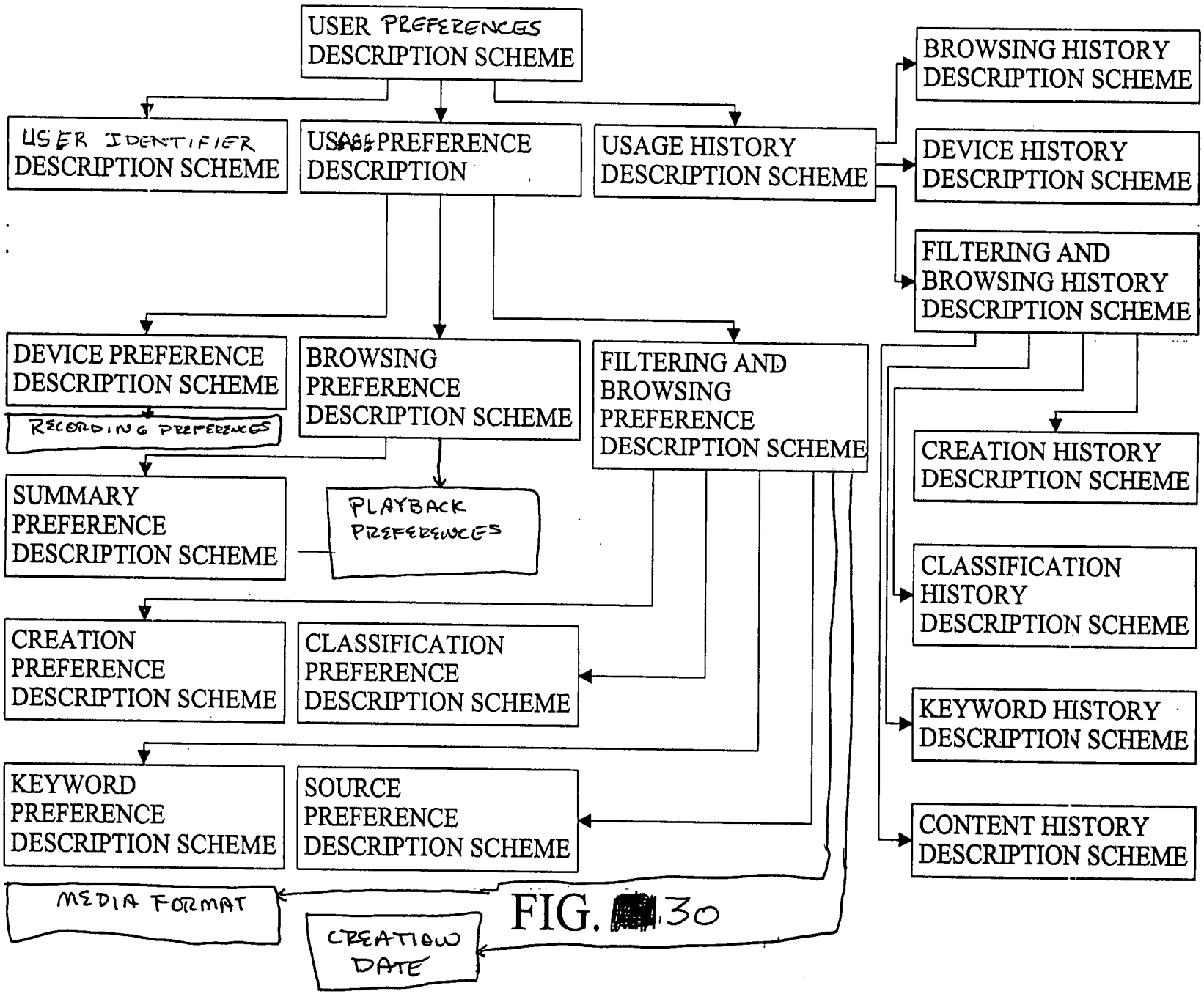
USER PREFERENCES DESCRIPTION SCHEME
USER IDENTIFIER DESCRIPTION SCHEME
USAGE PREFERENCE DESCRIPTION
USAGE HISTORY DESCRIPTION SCHEME
BROWSING HISTORY DESCRIPTION SCHEME
DEVICE HISTORY DESCRIPTION SCHEME
FILTERING AND BROWSING HISTORY DESCRIPTION SCHEME
DEVICE PREFERENCE DESCRIPTION SCHEME
RECORDING PREFERENCES
BROWSING PREFERENCE DESCRIPTION SCHEME
FILTERING AND BROWSING PREFERENCE DESCRIPTION SCHEME
CREATION HISTORY DESCRIPTION SCHEME
SUMMARY PREFERENCE DESCRIPTION SCHEME
PLAYBACK PREFERENCES
CLASSIFICATION HISTORY DESCRIPTION SCHEME
CREATION PREFERENCE DESCRIPTION SCHEME
CLASSIFICATION PREFERENCE DESCRIPTION SCHEME
KEYWORD HISTORY DESCRIPTION SCHEME
KEYWORD PREFERENCE DESCRIPTION SCHEME
SOURCE PREFERENCE DESCRIPTION SCHEME
CONTENT HISTORY DESCRIPTION SCHEME
MEDIA FORMAT
CREATION DATE

FIG. 30